

What is claimed is:

1. A gamma camera apparatus for detecting gamma rays emitted from a radioisotope administered to an examinee to construct a three-dimensional image representing a distribution of the radioisotope in the examinee, comprising:

detecting means for detecting gamma rays emitted from the radioisotope in the examinee;

an encoding aperture plate disposed between the examinee and said detecting means;

adjusting means for adjusting the distance from said detecting means to said encoding aperture plate to adjust the position of said encoding aperture plate depending on the depth of an observation position in the examinee; and

processing means for reconstructing a three-dimensional image based on the gamma rays emitted from the radioisotope and detected by said detecting means through said encoding aperture plate.

2. A gamma camera apparatus according to claim 1, wherein said adjusting means comprises means for adjusting an enlargement ratio  $\alpha$  of said encoding aperture plate with respect to said detecting means as viewed from said observation position in a range from 1.5 to 3.5.

3. A gamma camera apparatus according to claim 1,

wherein said detecting means comprises a plurality of semiconductor detecting elements.

4. A gamma camera apparatus according to claim 3,  
5 wherein said semiconductor detecting elements are made of CdTe or CdZnTe.

5. A gamma camera apparatus according to claim 1,  
10 wherein said detecting means comprises a one-dimensional array of detecting elements.

6. A gamma camera apparatus according to claim 1,  
15 wherein said detecting means comprises a two-dimensional array of detecting elements.

7. A gamma camera apparatus according to claim 1,  
20 wherein said detecting means comprises a scintillator for converting the wavelength of gamma rays, and a position-sensitive photomultiplier for detecting light obtained by said scintillator.

8. A gamma camera apparatus according to claim 7,  
25 wherein said scintillator and said position-sensitive photomultiplier are interconnected by an optical fiber.

9. A gamma camera apparatus according to claim 1,  
wherein said detecting means comprises a scintillator for

converting the wavelength of gamma rays, and a plurality of photodiodes for detecting light obtained by said scintillator.

5           10. A gamma camera apparatus according to claim 7, wherein said scintillator is made of a material selected from the group consisting of NaI:Tl, CsI:Na, LuSiO<sub>5</sub>:Ce(LSO), (Lu<sub>1-x</sub>Gd<sub>x</sub>)SiO<sub>5</sub>:Ce(LGSO), and YAlO<sub>3</sub>.

10           11. A gamma camera apparatus according to claim 1, wherein said encoding aperture plate comprises a collimator having a one-dimensional array of apertures defined according to a rule of an M sequence.

15           12. A gamma camera apparatus according to claim 1, wherein said encoding aperture plate comprises a collimator having a two-dimensional array of apertures defined according to a rule of an M array.

20           13. A gamma camera apparatus according to claim 1, wherein said encoding aperture plate comprises an M-sequence collimator having a one-dimensional array of apertures over at least one period or an M-array collimator having a two-dimensional array of apertures over at least one period.

25           14. A gamma camera apparatus according to claim 13, wherein said detecting means comprises means for detecting

at most a range  $L \cdot (D + Z)/D$  in the examinee where L represents the length of one period of said apertures, Z the distance from said collimator to the observation position in said examinee, and D the distance from said collimator to said detecting means.

15. A gamma camera apparatus for detecting gamma rays emitted from a radioisotope administered to an examinee to construct a three-dimensional image representing a distribution of the radioisotope in the examinee, comprising:

detecting means for detecting gamma rays emitted from the radioisotope in the examinee;

an encoding aperture plate disposed between the examinee and said detecting means;

image reconstructing means for reconstructing a three-dimensional image based on the gamma rays detected by said detecting means;

image display means for displaying the reconstructed three-dimensional image; and

image supply means for supplying an image to be used in superposed relation to said reconstructed three-dimensional image.

16. A gamma camera apparatus according to claim 15, further comprising:

adjusting means for adjusting the distance from said

detecting means to said encoding aperture plate to adjust the position of said encoding aperture plate depending on the depth of an observation position in the examinee;

5        said image reconstructing means comprising means for reconstructing a three-dimensional image based on the gamma rays emitted from the radioisotope and detected by said detecting means through said encoding aperture plate.

10        17. A gamma camera apparatus according to claim 15, wherein said image supply means comprises a computerized tomography diagnostic device.

15        18. A gamma camera apparatus according to claim 15, wherein said image supply means comprises a nuclear medicine diagnostic device.

20        19. A gamma camera apparatus according to claim 15, wherein said image supply means comprises magnetic resonance diagnostic device.

20        20. A gamma camera apparatus according to claim 15, wherein said image supply means comprises a digital camera device.